

In the claims:

1-112 (Cancelled).

113. (New) A method of attaching monomers at specific reaction sites on a substrate, said specific reaction sites containing one or more non-photolabile protected initiating moieties, the method comprising:

a) contacting said substrate with a liquid solution comprising one or more photo-reagent precursors, said precursors selected from the group consisting of acid and base precursors, such that said liquid solution is in contact with said initiating moieties;

b) isolating said specific reaction sites;

c) irradiating a selected number of the isolated reaction sites to produce, in situ, at least one photo-generated reagent without the formation of a polymeric coating layer, thereby directly deprotecting the initiating moieties at the irradiated reaction sites so as to create deprotected initiating moieties; and

d) contacting said substrate with a first monomer, said first monomer comprising an unprotected reactive site and a protected reactive site, under conditions such that said unprotected reactive site of said monomer couples with said deprotected initiating moieties so as to create an attached first monomer.

114. (New) The method of claim 113, wherein said initiating moieties of step (a) comprise linker molecules, each of said linker molecules comprising a reactive functional group protected by an acid-labile protecting group.

115. (New) The method of claim 114, wherein said reactive functional group of said linker molecules comprises a hydroxyl group.

116. (New) The method of claim 113, wherein said first monomer is selected from the group consisting of nucleophosphoramidites, nucleophosphonates and analogs thereof.

117. (New) The method of claim 113, wherein said attached first monomer of step (d) comprises a nucleotide monomer with a protected group.

118. (New) The method of claim 117, wherein said protected group is protected by an acid-labile group.

119. (New) The method of claim 117, further comprising the step of deprotecting said protected group so as to create a deprotected attached nucleotide monomer.

120. (New) The method of claim 119, further comprising the step of contacting said deprotected attached nucleotide monomer with a second monomer, said second monomer comprising an unprotected reactive site and a protected reactive group, under conditions such that said unprotected reactive site of said second monomer couples with said deprotected attached nucleotide monomer so as to create an attached second monomer, said attached first and second monomers comprises a multimer.

121. (New) The method of claim 120, wherein said multimer comprises DNA.

122. (New) The method of claim 113, wherein said initiating moieties of step (a) comprise oligomers to which a monomer can be attached.